Abstract

The main part of the world's fisheries harvest is derived in the coastal areas and the intense pressure on the marine ecosystems has made it important to identify essential functions of coastal habitats for humanity. An important element in moving toward sustainable fisheries is the identification, conservation, and restoration of essential fish habitats. For this purpose, new information is needed to identify and evaluate how habitat specific characteristics may influence habitat use and recruitment success of fish associated to shallow coastal habitats. This information is fundamental for describing essential fish habitats and to determine the importance of coastal areas for fish.

This thesis illustrates the importance of shallow coastal habitats (0 to 10 m depth) for different fish species and fisheries on the Swedish west coast. A method was developed to quantify the spatial extension and geographical variation in the distribution of the main coastal habitats. Furthermore, spatial and monthly field samplings were conducted to assemble quantitative data on the distribution and density of fish and fish food in these shallow habitats. The information was subsequently used to analyse the habitat dependence of fish and to describe the link between the coastal habitats and the fisheries. Furthermore, the habitat dependence of fish was used to perform an economic evaluation of the major habitats on the Swedish west coast. The results have shown that there exists a strong link between the major coastal habitats, the fish utilising them and the fisheries on the Swedish west coast.

Soft sediment bottoms free of vegetation displayed the largest areal extent (54 %) along the coast, followed by algae covered rocky habitats and seagrass beds. Shallow sediment bottoms are important nursery grounds for plaice (*Pleuronectes platessa*) and larval supply to these areas was a major factor influencing the recruitment success of this species. Nursery grounds on the Swedish west coast may contribute up to 77 % of the plaice recruits to the Skagerrak and Kattegat plaice population.

The fish assemblage in the rocky bottom habitat was dominated by stationary non-commercial species and on soft bottoms the dominant species were temporary visitors of commercial interest, utilizing the coastal habitat during parts of their life cycle. In the rocky bottom habitat, the diets of fish were highly associated to the available food resource whereas the fish species on soft bottoms generally were less dependent on habitat associated prey. These results imply that rocky bottoms are important habitats for fish production. However, the total biomass of commercial fish species was approximately 20 % higher on soft bottoms compared to rocky bottoms, thus suggesting that soft bottoms would be of more importance for the fisheries on the Swedish west coast.

The combined results from the studies performed in this thesis suggest a strong dependence of several commercial fish species to the major shallow habitats on the Swedish west coast. Moreover, the importance of these fish species in the commercial fisheries further emphasizes the value of these habitats. In order to manage the commercial fish stocks in the Skagerrak and Kattegat area, catch restrictions might be a first-best measure for urgent action, but the dependence of fish to coastal habitats suggests habitat restoration and protection as complementary measures. For example, a one km^2 increase in the availability of shallow soft sediment bottoms would give an increase in profits in the plaice fisheries amounting to a value of about SEK 300-360 millions over a 55 year time period.

In conclusion, in future management of fisheries, it is of great importance that the management policy makers not only considers fish stocks and number of recruits entering the fishery, but also take into account factors affecting the quality of essential fish habitats that a species is dependent on to complete its life-cycle.